## REMARKS

Reconsideration and allowance are respectfully requested in light of the above amendments and the following remarks.

The claims have been amended to overcome the objections in Section 7 of the Office Action and to clarify patentable aspects of this invention.

Claims 1-40 stand rejected under 35 USC 102(a) as anticipated by US 6,901,063 to Vayanos. It is submitted that the amended claims overcome theses rejections for at least the following reasons.

The present invention is directed to solving a problem in a context of uplink data transmissions during soft handover, that is, where the uplink transmission involves one HARQ transmitter (the communication terminal) and plural HARQ receivers (the plural base stations of the communication terminal's active set).

The invention is directed to solving a problem of soft buffer corruption in a base station during soft handover. A soft buffer is a buffer for implementing HARQ in a Node-B (base station). Data packets received, but not acknowledged, by the base station are temporarily stored in the soft buffer for incremental combining. Therefore, a data packet transmitted, but not acknowledged previously, is combined with a rctransmission of the same data packet transmitted in response to NACK signaling. The soft buffer corruption eauses misalignment of an HARQ protocol state among different base stations and can lead to loss of the soft handover gain. The present invention supports efficient HARQ operation without the problems associated with prior art systems.

From the above, it is apparent that the problem of soft buffer corruption in a base station exists only in a scenario of uplink data communications during soft handover in which one HARQ transmitter (UE or communication terminal) transmits to plural HARQ receivers (plural base stations of the communication terminal's active set). This problem is not present during HARQ downlink transmissions.

Specifically, the problem solved by the Applicants' independent claims is the avoidance of soft-buffer corruption in a base station DURING uplink data transmission of a mobile terminal that is in soft handover, i.e., is sending its uplink data to plural base stations simultaneously.

The term soft-buffer corruption means in this context that a base station misses or incorrectly decodes the control signaling related to uplink PDUs (i.e. the individual uplink data packets), so that it does not detect an indication of a new PDU being sent in the control signaling (NDI bit in the control signaling) and therefore erroneously combines the data of a new PDU sent on the HARQ process with data of the previous PDU sent on the HARQ process still being stored in the HARQ soft buffer region associated to the HARQ process instead of flushing the HARQ soft buffer region for the new PDU (sec application, page 11, line 16 *et seq.*).

The overall concept of the Applicants' claimed invention is substantially different and not related to what is taught by Vayanos. The present claimed invention addresses different scenarios and problems than those addressed by Vayanos and second the different time spans monitored by Vayanos (col. 13, lines 16 to 24, the HARQ channel waits for the transmission of a new packet or a retransmission of the current packet on the HARQ channel until the inactivity timer elapses and the HARQ channel is deemed inactive) and the present claimed invention

("elapsed time since storing said data in the soft-buffer region associated to the HARQ process employed to receive the data to flush by said at least one base station the soft-buffer region associated to the HARQ process employed to receive the data, whereby soft-buffer corruption is avoided").

It is to be particularly noted that Vayanos relates to a HARQ technique for <u>downlink</u> transmissions and thus does not encounter or solve the problem of soft buffer corruption.

To the contrary, Vayanos discloses a technique involving downlink data transmissions from <u>a single</u> HARQ transmitter (base station) to <u>a single</u> HARQ receiver (communication terminal). While Vayanos mentions that soft handover can be supported for uplink and downlink, Vayanos nowhere teaches any technique relating to <u>uplink HARQ transmissions during soft handover</u>.

Further, the main thrust of the Vayanos patent does not even relate to the soft handover scenario. Rather, because the Vayanos technique involves downlink data transmissions from one HARQ transmitter (base station) to a single HARQ receiver (communication terminal), the use of the inactivity timer for the HARQ processes in Vayanos relates to detection of the activity of a given HARQ channel (HARQ process), that is, the activity for transmission on a given HARQ process. The purpose of this is to avoid the necessity for the HARQ process to wait indefinitely for the transmission of a new packet or a retransmission of the current packet on the HARQ channel, because, if the inactivity timer elapses, the HARQ channel (HARQ process) is deemed inactive. The inactivity timer is set to the maximum time needed to perform two retransmissions, thus rendering the probability of erroneously discarding a packet still being transmitted to an acceptable level.

In contrast to Vayanos, present independent claim 40 is directed to a method for avoiding soft buffer corruption in a HARQ protocol involving uplink data transmission in which a communication terminal is in simultaneous communication with a plurality of base stations during the soft handover. The uplink transmission involves one HARQ transmitter (the communication terminal) and plural HARQ receivers (the plural base stations of the communication terminal's active set). The data transmitted by the communication terminal is stored in a soft-buffer region of a HARQ soft buffer of at least one of the base stations, with the soft-buffer region being associated to the HARQ process employed to receive the data. The at least one of the base stations decodes the data stored in the soft-buffer region. By employing the time elapsed since the data is stored in the soft-buffer region, the at least one base station flushes the soft-buffer region thereby avoiding soft-buffer corruption.

Independent claim 72 is a counterpart apparatus claim of method claim 40.

According to dependent claim 47, retransmission data is received from the communication terminal by at least one of the base stations employing the one of the HARQ processes, the received retransmission data is stored in a soft-buffer region associated to the one of the HARQ processes, the data stored in the soft-buffer region is decoded and timing of the elapsed time is restarted. Claim 77 depends from claim 72 and recites similar subject matter to claim 47.

According to dependent claim 48, retransmission data is received from the communication terminal by at least of the base stations employing said one of the HARQ processes, and timing of the elapsed time is stopped if the decoding is successful. Claim 78 depends from claim 72 and recites similar subject matter to claim 48.

According to dependent claim 49, retransmission data is received from the communication terminal by at least one of the base stations employing said one of the HARQ processes, the received retransmission data is combined with the previously received data in said one of of the HARQ processes to produce a combined data, timing of the elapsed time is restarted, and the combined data is decoded.

According to dependent claim 50, timing of the elapsed time is stopped if the elapsed time is equal to or larger than a threshold time period. Claim 80 depends from claim 72 and recites similar subject matter to claim 50.

In contrast to the uplink HARQ technique of the present claimed invention, Vayanos relates to downlink transmissions using HARQ (cf. Figs. 7A to 7D; col. 4, line 56 to col. 5, line 18; col. 5, lines 35 to 42 and lines 48 to 49; col. 6, lines 26 to 32 and lines 48 to 51; and many more passages). Vayanos relates to downlink data transmission from one HARQ transmitter (base station (NB)) to a single HARQ receiver (communication terminal (UE)).

In col. 4, lines 25 to 35, Vayanos states that:

> *"Each terminal may communicate with one or more base stations on the downlink and/or uplink at any given moment, depending on whether or not the terminal is active, whether or not soft handover is supported for the data transmission, and whether or not the terminal is in soft handover."*

However, this teaching does not imply that Vayanos relates to HARQ transmissions on uplink during soft handover, but merely mentions generally that soft handover can be supported for uplink and downlink. A reading of the entire Vayanos patent shows that the technical problem addressed therein is not related to the soft handover scenario, as will be explained below.

The problem solved by the present claimed invention (i.e., avoiding soft buffer corruption

in a base station during soft handover) is specific to the scenario assumed by the Applicants' claimed invention. That is, the problem address by the present claimed subject matter, i.e., the avoidance of HARQ soft-buffer corruption, exists only in a scenario of uplink data transmission during soft handover where there is one HARQ transmitter (the communication terminal) and plural HARQ receivers (the plural base stations of the communication terminal's active set). In the scenario of Vayanos, i.e., for downlink transmissions, this problem does not exist, as there is only one HARQ receiver, the communication terminal.

As a result, Vayanos' use of an inactivity timer for the HARQ processes is not related to the use of a timer (implicit to the subject matter of "employing the time elapsed since storing said data in the soft-buffer region associated to the HARQ process utilized to receive the data") in the present claimed invention.

In Vayanos, the inactivity timer used for the HARQ processes on the downlink is used to detect the activity of a given HARQ channel, i.e., the activity for transmission on a given HARQ process (cf. col. 10, lines 41 to 65; col. 12, lines 26 to col. 13, lines 46). The purpose of the inactivity timer of Vayanos is to avoid a problem in the situation where the base stations have no more data to transmit on the downlink, so there is no activity on any of the HARQ channels.

Vayanos states:

> *"Without new activity, it is not possible for the UE to ascertain whether a given packet has been discarded by the network or that a retransmission for the packet is forthcoming. For each HARQ channel that is waiting for a packet that has been discarded by the transmitter and for which no new packet has been sent, the re-ordering entity associated with this HARQ channel will have to wait until the long timer maintained for the re-ordering queue elapses before it can deliver the available data to higher layers. The HARQ process will itself wait indefinitely for the transmission of a new packet or a retransmission of the current packet on the HARQ channel." (cf. col. 12, line 58 to col. 13, line 2).*

As outlined in Vayanos' subsequent section, col. 13, lines 3 to 15, the inactivity timer avoids a situation where the HARQ process will itself wait indefinitely for the transmission of a new packet or a retransmission of the current packet on the HARQ channel. If the inactivity timer elapses, the HARQ channel (i.e. the HARQ process) is deemed inactive (cf. also col. 19, line 66 to col. 20, line 5; col. 20, lines 25 to 41).

In view of this teaching, it becomes also apparent why Vayanos does not consider soft handover in the discussion of his embodiments: The soft handover status of the communication terminal has no implication on the technical problem addressed in Vayanos.

As further outlined in col. 13, lines 16 to 34, the inactivity timer is set according to:

> *"the maximum time needed to perform two retransmissions, then the probability of erroneously discarding a packet still being transmitted would be approximately the same as the desired probability of NAK to ACK error, which is desirable since the two have essentially the same effect" and is restarted "each time a new control message is received on the control channel for a particular active HARQ channel."*

In contrast to the present claimed invention, the inactivity timer of Vayanos thus does not indicate "an elapsed time since storing said data in the soft-buffer region associated to the HARQ process utilized to receive the data," but is set to "cover the maximum amount of time expected to take to receive a control message for an active HARQ channel (or two control messages, just in case the first one was missed)" as explained in col. 13, lines 16 to 34.

In light of the above points, it is submitted that method claim 40 is not anticipated by Vayanos. Independent claim 72 is a counterpart apparatus claim of claim 40 and is deemed to allowable for similar reasons that claim 40 is allowable. All other claims depend directly or indirectly from claim 40 or claim 72 and are considered to be allowable due to their dependence

from an allowable claim and due to their recitation of subject matter that provides an independent basis for their individual allowability.

Accordingly, in light of the foregoing, it is submitted that all pending claims are directed to allowable subject matter, and a notice of allowance is respectfully requested.

If any issues remain which may best be resolved through a telephone communication, the examiner is requested to telephone the undersigned at the local Washington, D.C. telephone number listed below.

Respectfully submitted,

/James Edward Ledbetter/

James E. Ledbetter
Registration No. 28,732

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JEL/att
ATTORNEY DOCKET NO. 007725-06102
DICKINSON WRIGHT PLLC
1875 Eye Street, N.W., Suite 1200
Washington, D.C. 20006
Telephone: (202) 785-0100
Facsimile: (202) 408-5200.